REMARK

Applicants respectfully request reconsideration of this application as amended. Claims 16, 18, 22, 24, 26, 32, 38, and 39 have been amended. Claims 17, 25, and 37 have been cancelled without prejudice. No claims have been added. Therefore, claims 16, 18-24, 26-36, and 38-42 are now presented for examination.

35 U.S.C. §102 Rejection,

Borg

The Examiner rejected claims 16, 17, 24 and 25 under 35 U.S.C. 102 as being anticipated by U.S. Patent No. 6,476,864 of Borg et al. (hereinafter referred to as "Borg").

Claims 17 and 25 have been cancelled. Claims 16 and 24 have been modified for clarification. Claim 16, as amended herein, reads as follows:

16. An apparatus comprising:
an analog photocell;
a sample and hold amplifier, a first input to the sample and hold amplifier being an output from the analog photocell, a second input to the sample and hold amplifier being a reference voltage, the sample and hold amplifier producing an output that is a scaled version of the output of the analog photocell, the scaled version of the output of the analog photocell being based at least in part on the reference voltage; and
an analog to digital converter, the analog to digital converter converting the output of the sample and hold amplifier to a digital value.

Among the elements of claim 16 is "a second input to the sample and hold amplifier being a reference voltage" and "the sample and hold amplifier producing an output that is a scaled version of the output of the analog photocell, the scaled version of the output of the analog photocell being based at least in part on the reference voltage". It is respectfully submitted that the reference voltage input shown in Borg does not and cannot result in the production of a scaled version of an output of an analog photocell based at least in part on the reference voltage. Borg describes a different type of system that is controlled by different factors.

In Figures 3A and 3B, a set of column amplifiers (elements 230 and 240) are shown with connections to an active pixel sensor array (element 280) and to a reference voltage (element 88). However, this drawing does not identify the purpose or function of the reference voltage. Referring to Figure 3A of Borg, the reference indicates that:

> Each of the column amplifiers 230 and reference column amplifier 240 is coupled to a reference voltage source 88, which is used to *level shift* the signals exiting the APS array 280 on each common column line 38.

(Borg, col. 6, lines 39-43) (emphasis added) Therefore, in Borg the reference voltage is not used for purposes of scaling an output, but is instead used to *shift the level* of signals, which is a different concept. In the case an output, scaling changes the dynamic range of signals. In case if shift the level of signals, the dynamic range is not altered, but the voltage level of the signals is modified.

The operation of the column amplifiers is shown more clearly in Figures 4 and 5 of Borg. As seen in the schematics of elements 230 and 240, the column amplifiers are actually comprised of amplifiers (elements 80 and 110) each with a single input. The reference voltage is then connected to switches (elements 84 and 90) and may charge

capacitors (elements 82 and 112) when the switches are closed. The charge on the capacitors may then be applied to the output of the amplifiers (elements 80 and 110) if other switches (elements 94 and 98) are closed. These and other switches are opened and closed according to certain phases of operation as indicated in Borg:

> During the first phase, switch 76 is closed as are switches 92 and 84. Amplifier 80 is shorted from input to output by switch 92 closure causing column amplifier offset voltage 116 to be present. Likewise, switch 84 closure causes the voltage reference source 88 and noise 86 to be placed on storage element 82.

(Borg, col. 8, lines 60-66)

> During phase 2, switch 92, switch 84, switch 90 and switch 96 open and switch 98 and switch 94 close. Switch 76 and switch 106 remain closed.

(Borg, col. 9, 27-29) It is clear from this operation that Borg does not teach or suggest any operation in which *scaling* of a signal is based on the reference voltage.

If there is a gain in the column amplifiers, it is not related to the reference voltage, but rather to the *capacitances* in the circuits. As indicated in Borg:

> Notably, gain can be added to the signal by adjusting the capacity C1 of storage element 78 and the capacity C2 of storage element 82 (and likewise, also capacities C3 and C4, holding C1/C2=C3/C4). The gain of the column amplifier is set by the ratio of C1 to C2.

(Borg, col. 10, lines 46-50) Again, Borg describes a different type of operation that is controlled by different factors.

Therefore, among numerous other differences with the claims, in Borg changing a reference voltage does *not* change the scaling of any signal. The outputs in the system described in Borg will have the same voltage difference, or dynamic range, if the

reference voltage is modified. Instead, the reference voltage only changes the *level* of the voltage output.

It is respectfully submitted that, for at least the above reasons, claim 16 is not anticipated by Borg. It is submitted that the above arguments also apply to claim 24 and that such claim is also allowable.

35 U.S.C. §103 Rejection,

Borg in View of Kanda

The Examiner has rejected claims 18, 19, 26 and 27 under 35 U.S.C. 103(a) as being unpatentable over Borg in view of U.S. Patent No. 5,929,905 of Kanda et al. (hereinafter referred to as "Kanda").

Kanda relates to an imaging apparatus. The basic structure of the apparatus is shown in Figure 1 of Kanda. Kanda does not contain the claim elements of independent claims 16 and 24 that, as shown above, are absent from Borg. Kanda does not teach or suggest the production of a scaled version of an output of an analog photocell based at least in part on a reference voltage. Because claims 18, 19, 26 and 27 are dependent on claims 16 and 24, these dependent claims are allowable as being dependent on the allowable base claims. Borg and Kanda, alone or in combination, do not teach or suggest the elements of the rejected claims.

Borg in view of Gordon et al.

The Examiner rejected claims 20-23 and 28-42 under 35 U.S.C. 103(a) as being unpatentable over Borg in view of U.S. Patent No. 3,833,903 of Gordon, et al. ("hereinafter referred to as Gordon").

Gordon refers to a voltage-controlled oscillator and to an analog to digital converter using such oscillator. (Gordon, col. 1, lines 8-11) Kanda does not contain the claim elements of independent claims 16 and 24 that, as shown above, are absent from Borg and Kanda. It is respectfully submitted that the arguments presented above are also applicable to independent claims 32 and 39, and thus such claims are also allowable. The remaining claims are dependent claims that, among other reasons, are allowable as being dependent on the allowable base claims. Borg and Gordon, alone or in combination, do not teach or suggest the elements of the rejected claims.

Conclusion

Applicants respectfully submit that the rejections have been overcome by the amendment and remark, and that the claims as amended are now in condition for allowance. Accordingly, Applicants respectfully request the rejections be withdrawn and the claims as amended be allowed.

Invitation for a Telephone Interview

The Examiner is requested to call the undersigned at (303) 740-1980 if there remains any issue with allowance of the case.

Request for an Extension of Time

Applicants respectfully petition for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17(a) for such an extension.

Charge our Deposit Account

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: 2/18/03

Mark C. Van Ness
Reg. No. 39,865

12400 Wilshire Boulevard
7th Floor
Los Angeles, California 90025-1030
(303) 740-1980

AMENDMENTS -- MARKED VERSION

Presented below are the amendments, with changes indicated. Insertions are underlined and deletions are bracketed.

In the claims:

*Please cancel **claims 17, 25, and 37** without prejudice.*

Please amend the claims as follows:

16. (Amended once) An apparatus comprising:

an analog photocell;

a sample and hold amplifier, a first input to the sample and hold amplifier being [a charge] an output from the analog photocell, a second input to the sample and hold amplifier being a reference voltage, the sample and hold amplifier producing an output that is a scaled version of the output of the analog photocell, the scaled version of the output of the analog photocell being based at least in part on the reference voltage; and

an analog to digital converter, the analog to digital converter converting the output of the sample and hold amplifier to a digital value.

17. (Cancelled)

18. (Amended twice) The apparatus of claim [17] 18, wherein the scaled version of the [voltage] output of the analog photocell produced by the sample and hold amplifier is chosen to match the dynamic range of the analog photocell with the dynamic range of the analog to digital converter.

22. (Amended once) The apparatus of claim 21, wherein the counter is reset after a certain period of time.

24. (Amended once) A method comprising:

inputting a charge of a analog photocell to a sample and hold amplifier;

inputting a reference voltage to the sample and hold amplifier;

modifying the scale of the analog photocell charge using the sample and hold amplifier, the modification of the scale of the analog photocell charge being based at least in part on the reference voltage; and

converting an output of the sample and hold amplifier to a digital value.

25. (Cancelled)

26. (Amended twice) The method of claim [25] 24, wherein the scale of the analog photocell charge is modified by the sample and hold amplifier to match a dynamic range of the analog photocell to a dynamic range appropriate for converting the output of the sample and hold amplifier to a digital value.

32. (Amended once) An digital photocell comprising:

an analog photocell;

a sample and hold amplifier, a first input of the sample and hold amplifier being an output of the analog photocell and a second input of the sample and hold amplifier being a reference voltage;

a voltage controlled oscillator, an input to the voltage controlled oscillator being an output of the sample and hold amplifier, the sample and hold amplifier

scaling the input to the voltage controlled oscillator based at least in part on the reference voltage;

a counter, a speed at which the counter operates being controlled by an output of the voltage controlled oscillator; and

a register, the register storing an output of the counter.

37. (Canceled)

38. (Amended once) The digital photocell of claim [37] 32, wherein the input to the voltage controlled oscillator is scaled based at least in part on ambient light levels.

39. (Amended once) A method comprising:

applying [a voltage] an output of a analog photocell as a first input to a sample and hold amplifier;

applying a reference voltage as a second input to the sample and hold amplifier;

modifying the scale of the output of the analog photocell using the sample and hold amplifier, the modification of the scale of the output of the analog photocell being based at least on the reference voltage; and

applying an output of the sample and hold amplifier to a voltage controlled oscillator;

driving a counter with the output of the voltage controlled oscillator;

saving a count from the counter; and

resetting the counter at the conclusion of a time period.